What is claimed is:

1. Circuitry for driving an inductive load, the circuitry comprising:

a battery switch having an open position and a closed position supplying a battery voltage to a high side of the inductive load;

a boost switch having an open position and a closed position supplying a boost voltage, greater than the battery voltage, to the high side of the inductive load;

a low-side switch having an open position and a closed position coupling a low-side of the inductive load to ground potential;

a capacitor having one terminal referenced to the battery voltage and an opposite terminal supplying the boost voltage to the boost switch;

a commutating diode having an anode connected to the low-side of the inductive load and a cathode connected to the opposite terminal of the capacitor; and

a control computer controlling the battery switch, boost switch and low-side switch to control current flow through the inductive load, the control computer directing energy in the inductive load to the opposite terminal of the capacitor via the commutating diode to charge the capacitor by controlling the boost switch and the low-side switch to their open positions.

2. The circuitry of claim 1 wherein the control computer is further operable to control the battery switch to its closed position when directing energy in the inductive load to the opposite terminal of the capacitor via the commutating diode.

3. The circuitry of claim 1 wherein the control computer is further operable to control the battery switch to its open position when directing energy in the inductive load to the opposite terminal of the capacitor via the commutating diode.

4. The circuitry of claim 1 further including a blocking diode having an anode connected to one terminal of the battery switch and a cathode connected to the high side of the inductive load;

wherein an opposite terminal of the battery switch is connected to the battery voltage, the battery switch configured in its closed position to connect the battery voltage to the high side of the inductive load with the blocking diode blocking current flow through the battery switch to the battery voltage, and it its open position to disconnect the battery voltage from the high side of the inductive load.

5. The circuitry of claim 4 wherein one terminal of the boost switch is connected to the opposite terminal of the capacitor, and an opposite terminal of the boost switch is connected to the high side of the inductive load, the boost switch configured in its closed position to connect the boost voltage to the high side of the inductive load, and in its open position to disconnect the boost voltage from the high side of the inductive load.

6. The circuitry of claim 1 further including a blocking diode having an anode connected to the battery voltage and a cathode connected to one terminal of the battery switch;

wherein an opposite terminal of the battery switch is connected to the high side of the inductive load, the battery switch configured in its closed position to connect the battery voltage to the high side of the inductive load with the blocking diode blocking current flow from the one terminal of the battery switch to the battery voltage, and it its open position to disconnect the battery voltage from the high side of the inductive load.

7. The circuitry of claim 6 wherein one terminal of the boost switch is connected to the opposite terminal of the capacitor, and an opposite terminal of the boost switch is connected to the one terminal of the battery switch, the boost switch configured in its closed position to connect the boost voltage to the high side of the inductive load when the battery switch is also in its closed position, and in its open position to disconnect the boost voltage from the one terminal of the battery switch.

8. The circuitry of claim 1 wherein the inductive load is a solenoid configured to control operation of a fuel injector.

9. The circuitry of claim 1 further including:

a recirculation diode having a cathode connected to the high side of the inductive load and an anode connected to ground potential, the recirculation diode conducting load current therethrough when the load current is decaying through the inductive load; and

a buffer circuit having an input connected to the high side of the inductive load and an output producing a voltage source feedback signal, the voltage source feedback signal having a first logic state when any of the boost switch is in its closed position, the battery switch is in its closed position and the boost switch, battery switch and low-side switch are all in their open positions and no load current from the inductive load is being conducted through the recirculation diode, and otherwise having a second logic state different than the first logic state.

10. The circuitry of claim 9 wherein the control computer is configured to control the battery switch, boost switch and low-side switch to control load current flow through the inductive load according to a series of current pulses.

11. The circuitry of claim 10 wherein the control computer is configured to initiate each of the series of current pulses by controlling the low-side switch to its closed position followed by controlling either of the boost switch and the battery switch to its closed position to cause the load current through the inductive load to increase, the control computer monitoring the voltage source feedback signal and controlling either of the boost switch and the battery switch to its closed position only if the voltage source feedback signal is in its second logic state after the low-side switch is controlled to its closed position.

12. The circuitry of claim 11 wherein the voltage source feedback signal indicates a circuit open or short condition if the voltage source feedback signal is in its first logic state after the low-side switch is controlled to its closed position.

13. The circuitry of claim 11 wherein each of the boost switch, the battery switch and the low-side switch is in its open position with no load current flowing through the recirculation diode prior to controlling the low-side switch to its closed position, the control computer controlling either of the boost switch and the battery switch to its closed position only if the voltage source feedback signal switches from its first logic state to its second logic state when the low-side switch is controlled to its closed position.

14. The circuitry of claim 13 wherein the voltage source feedback signal indicates a circuit open or short condition if the voltage source feedback signal is either of in its second logic state before the low-side switch is controlled to its closed position and in its first logic state after the low-side switch is controlled to its closed position.

15. The circuitry of claim 11 wherein the control computer is configured to control either of the boost switch and the battery switch to its open position when the load current through the inductive load increases to a peak current level.

16. The circuitry of claim 15 wherein the control computer is configured to determine a duration of load current rise to the peak current level as a time difference between switching of the voltage source feedback signal from its second logic state to its first logic state when either of the boost switch and the battery switch is controlled to its closed position and switching of the voltage source feedback signal from its first logic state to its second logic state when either of the boost switch and the battery switch is thereafter controlled to its open position.

17. The circuitry of claim 1 further including:

a plurality of inductive loads having high sides all connected together;

a corresponding plurality of commutating diodes each having an anode connected to a low-side of an associated one of the plurality of inductive loads, and a cathode connected to the opposite terminal of the capacitor; and

a corresponding plurality of low-side switches each having an open position and a closed position coupling a low-side of an associated one of the plurality of inductive loads to ground potential;

wherein the control computer is configured to control the battery switch, boost switch and plurality of low-side switches to control current flow through the plurality of inductive loads, the control computer directing energy from the plurality of inductive loads to the opposite terminal of the capacitor via associated ones of the plurality of commutating diodes to charge the capacitor by controlling the boost switch and the associated ones of the plurality of low-side switches to their open positions.

18. The circuitry of claim 17 wherein the control computer is further operable to control the battery switch to its closed position when directing energy in the plurality of inductive loads to the opposite terminal of the capacitor via the associated ones of the plurality of commutating diodes.

19. The circuitry of claim 17 wherein the control computer is further operable to control the battery switch to its open position when directing energy in the plurality of inductive loads to the opposite terminal of the capacitor via the associated ones of the plurality of commutating diodes.

20. The circuitry of claim 17 wherein the control computer is configured to command a series of capacitor recharge pulses to recharge the capacitor, the control computer configured for each of the series of capacitor recharge pulses to control the battery switch and each of the plurality of low-side switches to their closed positions while controlling the boost switch to its open position to cause load currents through each of the plurality of inductive loads to increase, followed by controlling each of the plurality of low-side switches to their open positions to direct energy from each of the plurality of inductive loads through a respective one of the plurality of commutating diodes to the opposite terminal of the capacitor.

21. The circuitry of claim 20 wherein the capacitor is further operable to control the battery switch to its closed position when directing energy from each of the plurality of inductive loads through a respective one of the plurality of commutating diodes to the opposite terminal of the capacitor.

22. The circuitry of claim 20 wherein the capacitor is further operable to control the battery switch to its open position when directing energy from each of the plurality of inductive loads through a respective one of the plurality of commutating diodes to the opposite terminal of the capacitor.

23. The circuitry of claim 17 wherein each of the plurality of inductive loads is a solenoid configured to control operation of one of a corresponding plurality of fuel injectors.

24. Circuitry for driving an inductive load, the circuitry comprising:

a battery switch having an open position and a closed position supplying a battery voltage to a high side of the inductive load;

a low-side switch having an open position and a closed position coupling a low-side of the inductive load to ground potential;

a recirculation diode having a cathode connected to the high side of the inductive load and an anode connected to ground potential, the recirculation diode conducting load current therethrough when the load current is decaying through the inductive load;

a buffer circuit having an input connected to the high side of the inductive load and an output producing a voltage source feedback signal, the voltage source feedback signal having a first logic state when either of the battery switch is in its closed position and the battery switch and low-side switch are each in their open positions and no load current from the inductive load is being conducted through the recirculation diode, and otherwise having a second logic state different than the first logic state; and

a control computer controlling the battery switch and the low-side switch to control load current through the inductive load according to a series of current pulses, the control computer initiating each of the series of current pulses by controlling the low-

side switch to its closed position followed by controlling the battery switch to its closed position to cause the load current through the inductive load to increase, the control computer monitoring the voltage source feedback signal and controlling the battery switch to its closed position only if the voltage source feedback signal is in its second logic state after the low-side switch is controlled to its closed position.

25. The circuitry of claim 24 wherein the voltage source feedback signal indicates a circuit open or short condition if the voltage source feedback signal is in its first logic state after the low-side switch is controlled to its closed position.

26. The circuitry of claim 24 wherein the battery switch and the low-side switch are in their open positions with no load current flowing through the recirculation diode prior to controlling the low-side switch to its closed position, the control computer controlling the battery switch to its closed position only if the voltage source feedback signal switches from its first logic state to its second logic state when the low-side switch is controlled to its closed position.

27. The circuitry of claim 26 wherein the voltage source feedback signal indicates a circuit open or short condition if the voltage source feedback signal is either of in its second logic state before the low-side switch is controlled to its closed position and in its first logic state after the low-side switch is controlled to its closed position.

28. The circuitry of claim 24 further including:

boost switch having an open position and a closed position supplying a boost voltage, greater than the battery voltage, to the high side of the inductive load;

a capacitor having one terminal referenced to the battery voltage and an opposite terminal supplying the boost voltage to the boost switch; and

a commutating diode having an anode connected to the low-side of the inductive load and a cathode connected to the opposite terminal of the capacitor;

wherein the control computer is configured to control the boost switch to control load current through the inductive load, and to direct energy in the inductive load

through the commutating diode to the opposite terminal of the capacitor to charge the capacitor by controlling the low-side switch and boost switch to their open positions.

29. The circuitry of claim 28 wherein the control computer is further operable to control the battery switch to its closed position when directing energy from the inductive load through the commutating diode to the opposite terminal of the capacitor.

30. The circuitry of claim 28 wherein the capacitor is further operable to control the battery switch to its open position when directing energy from the inductive load through the commutating diode to the opposite terminal of the capacitor.

31. The circuitry of claim 24 wherein the inductive load is a solenoid configured to control operation of a fuel injector.

32. Circuitry for driving an inductive load, the circuitry comprising:

a battery switch having an open position and a closed position supplying a battery voltage to a high side of the inductive load;

a boost switch having an open position and a closed position supplying a boost voltage, greater than the battery voltage, to the high side of the inductive load;

a capacitor supplying the boost voltage to the boost switch;

a low-side switch having an open position and a closed position coupling a low-side of the inductive load to ground potential;

a commutating diode having an anode connected to the low-side of the inductive load and a cathode connected to the capacitor;

a recirculation diode having a cathode connected to the high side of the inductive load and an anode connected to ground potential, the recirculation diode conducting load current therethrough when the load current is decaying through the inductive load;

a buffer circuit having an input connected to the high side of the inductive load and an output producing a voltage source feedback signal, the voltage source feedback signal having a first logic state when any of the boost switch is in its closed position, the battery switch is in its closed position and the boost switch, battery switch and low-side

switch are all in their open positions and no load current from the inductive load is being conducted through the recirculation diode, and otherwise having a second logic state different than the first logic state; and

a control computer configured to control the battery switch, boost switch and low-side switch to control load current flow through the inductive load according to a series of current pulses, the control computer initiating each of the series of current pulses by controlling the low-side switch to its closed position followed by controlling either of the boost switch and the battery switch to its closed position to cause the load current through the inductive load to increase, the control computer monitoring the voltage source feedback signal and controlling either of the boost switch and the battery switch to its closed position only if the voltage source feedback signal is in its second logic state after the low-side switch is controlled to its closed position.

33. The circuitry of claim 32 wherein the voltage source feedback signal indicates a circuit open or short condition if the voltage source feedback signal is in its first logic state after the low-side switch is controlled to its closed position.

34. The circuitry of claim 32 wherein each of the boost switch, the battery switch and the low-side switch is in its open position with no load current flowing through the recirculation diode prior to controlling the low-side switch to its closed position, the control computer controlling either of the boost switch and the battery switch to its closed position only if the voltage source feedback signal switches from its first logic state to its second logic state when the low-side switch is controlled to its closed position.

35. The circuitry of claim 34 wherein the voltage source feedback signal indicates a circuit open or short condition if the voltage source feedback signal is either of in its second logic state before the low-side switch is controlled to its closed position and in its first logic state after the low-side switch is controlled to its closed position.

36. The circuitry of claim 32 wherein the control computer is configured to control either of the boost switch and the battery switch to its open position when the load current through the inductive load increases to a peak current level.

37. The circuitry of claim 36 wherein the control computer is configured to determine a duration of load current rise to the peak current level as a time difference between switching of the voltage source feedback signal from its second logic state to its first logic state when either of the boost switch and the battery switch is controlled to its closed position and switching of the voltage source feedback signal from its first logic state to its second logic state when either of the boost switch and the battery switch is thereafter controlled to its open position.

38. Circuitry for driving a plurality of inductive loads, the circuitry comprising:

a battery switch having an open position and a closed position supplying a battery voltage to high sides of the plurality of inductive loads;

a boost switch having an open position and a closed position supplying a boost voltage, greater than the battery voltage, to the high sides of the plurality of inductive loads;

a plurality of low-side switches each having an open position and a closed position coupling a low-side of a corresponding one of the plurality of inductive loads to ground potential;

a capacitor supplying the boost voltage to the boost switch;

a plurality of commutating diodes each having an anode connected to the low-side of a corresponding one of the plurality of inductive loads and a cathode connected to the capacitor; and

a control computer controlling the battery switch, boost switch and plurality low-side switches to control load current flow through the plurality of inductive loads, the control computer commanding a series of capacitor recharge pulses to recharge the capacitor by controlling the battery switch and each of the plurality of low-side switches to their closed positions while controlling the boost switch to its open position to cause load currents through each of the plurality of inductive loads to increase, followed by

controlling each of the plurality of low-side switches to their open positions to direct energy from each of the plurality of inductive loads through a respective one of the plurality of commutating diodes to the capacitor.

39. The circuitry of claim 38 wherein the control computer is further operable to control the battery switch to its closed position when directing energy from each of the plurality of inductive loads through a respective one of the plurality of commutating diodes to the capacitor.

40. The circuitry of claim 38 wherein the control computer is further operable to control the battery switch to its open position when directing energy from each of the plurality of inductive loads through a respective one of the plurality of commutating diodes to the capacitor.

41. The circuitry of claim 38 wherein each of the plurality of inductive loads is a solenoid configured to control operation of one of a corresponding plurality of fuel injectors;

and wherein the control computer is configured to control the durations of the closed positions of the battery switch and each of the plurality of low-side switches for each of the series of capacitor recharge pulses to limit the load current through each of the plurality of solenoids below a level sufficient to actuate an associated one of the corresponding plurality of fuel injectors.

42. Circuitry for driving an inductive load, the circuitry comprising:

a high-side switch having an open position and a closed position supplying a source voltage to a high side of the inductive load;

a low-side switch having an open position and a closed position coupling a low-side of the inductive load to ground potential;

a recirculation diode having a cathode connected to the high side of the inductive load and an anode connected to ground potential, the recirculation diode conducting load current therethrough when the load current is decaying through the inductive load;

a buffer circuit having an input connected to the high side of the inductive load and an output producing a voltage source feedback signal, the voltage source feedback signal having a first logic state when either of the battery switch is in its closed position and the battery switch and low-side switch are each in their open positions and no load current from the inductive load is being conducted through the recirculation diode, and otherwise having a second logic state different than the first logic state; and

a control computer controlling the low-side switch to its closed position followed by controlling the high-side switch to its closed position to cause the load current through the inductive load to increase, followed by controlling the high-side switch to its open position when the load current through the inductive load increases to a peak current level, the control computer determining a duration of load current rise to the peak current level as a time difference between switching of the voltage source feedback signal from its second logic state to its first logic state when the high-side switch is controlled to its closed position and switching of the voltage source feedback signal from its first logic state to its second logic state when the high-side switch is thereafter controlled to its open position.